No.	Date and time of day. 1907.	Nature of phenomenon.	Previous minimum.	Previous maximum.	Mean barometer for preceding 24 hours.	Following minimum.	Following maximum.	Mean barometer for following 24 hours.	Weather at time of observation.	Weather during following 24 hours.	Description of phenomenon and general remarks.
1	2	3	4	5	6	7	8	9	10	11	12
			° C.	° C.	*Inches.*	° C.	° C.	*Inches.*			
1	Jan. 4, 8 p. m.	Corona, M...	0.0	4.0	29.84, rising from 29.45 to 30.12.	0.2	9.0	30.10, falling from 30.12 to 30.02.	Fine, windy, frosty, passing clouds.	Warm, gray, misty..	Extending to 4 d. from limb. Reddish edge.
2	Jan. 27, 8 p. m.	Corona, M...	−4.9	4.4	30.10, falling from 30.22 to 29.94.	3.3	9.4	29.67, falling from 29.94 to 29.58.	Fine, cold, windy, passing clouds.	Fine and windy; stormy and rain.	Extending from 6 d. to limb. Edge strongly red.
3	Jan. 29, 6 p. m.	Pillar, M....	2.7	5.8	29.89, variable.....	0.9	4.9	29.43, rising from 29.28 to 29.70.	Fine, cold, windy, passing clouds.	Gale, with a squall of snow.	Same width as the disk, height 5 to 6 d. Moon just hidden by crest of low, black clouds.
4	Jan. 29, 10 p. m.	Corona, M. .	2.7	5.8	29.36, variable.....	0.9	4.9	29.59, rising from 29.28 to 29.75.	Fine, cold, windy, passing clouds.	Gale, with a squall of snow.	Up to 6 d. from limb. Outer third reddish.
5	Feb. 2, 12 p. m.	Annulus, M.	−0.8	3.0	30.10, rising from 30.02 to 30.20.	−1.4	2.3	30.23, variable.....	Fine, still, frosty, very pure sky.	Overcast, misty, a few flakes of snow (powdered snow).	One ring colorless, with sharp red edge, width 1 d. One moment a second round it, same width, much paler; then a third, very faint, same width, round the two others.
6	Feb. 10, 2 p. m.	Halo, S.....	−0.1	7.5	29.56, variable.....	2.1	5.3	29.45, variable.....	Fine, warm, light wind, passing clouds.	Pouring rain, stormy snow (wet all day).	Halo of 22°. Sextant measure: 22° 30′ from center of disk to middle of band. Inner edge red; lasted 2 hours.
7	Feb. 14, 3 p. m.	Halo and annulus, S.	1.3	6.0	29.60, rising from 29.40 to 29.95.	3.9	9.5	29.88, falling from 29.95 to 29.78.	Fine, warm, light wind, veiled sky.	Gray and still; rain.	Halo of 22°, indistinct, upper half only visible, inner edge slightly red. Sun in reddish ("smoky") patch. Transient.
8	Feb. 16, 2 p. m.	Halo and annulus, S.	*	*	29.78, variable.....	4.8	10.7	29.85, variable.....	Fine, warm, windy, veiled sky.	Overcast, stormy. ..	Very indistinct halo of 22°, upper half only visible. Sun in reddish ("smoky") patch.
9	Feb. 16, 8 p. m.	Annulus, M.	*	*	29.80, variable.....	4.8	10.7	29.85, variable.....	Fine, warm, still, overcast.	Overcast, stormy, a little rain.	Radius about 1 d. Center at center of crescent moon, undefined edge.
10	Feb. 19, noon.	Halo, S.....	4.3	9.5	29.64, variable.....	0.7	10.0	29.05, falling from 29.56 to 28.86.	Cloudy, very windy.	Stormy, pouring rain, gale, squalls of wind and rain.	Halo of 22°, inner edge reddish, outer edge bluish.
11	Feb. 25, 11 p. m.	Corona, M...	3.6	9.3	30.03, rising from 29.93 to 30.13.	5.2	6.7	30.14, rising from 30.13 to 30.19.	Overcast, gray, light wind.	Overcast, yellow fog.	Up to 6 d. indistinct, outer edge reddish.
12	Feb. 28, 3 p. m.	Double halo, S.	0.4	9.4	30.29, variable.....	0.9	11.5	30.23, falling from 30.30 to 30.15.	Fine, still, warm....	Thick white fog; fine, still, warm.	Inner halo faint, outer very faint. Sun's altitude 10°.
13	Feb. 28, 9 p. m.	Halo and annulus, M.	0.4	9.4	30.29, variable	0.9	11.5	30.21, falling from 30.26 to 30.15.	Fine, still.....	Thick white fog; still, warm.	Well defined halo of 22°. Sextant measurement, 22° 30′; width about 2 d. Inner edge distinctly red; lasted two hours. Annulus with sharp edge; width, by sextant, 6′ from limb; round this a second faint annulus up to 1 d. from limb.
14	Mar. 1, 2 p. m.	Halo, S.....	0.9	11.5	30.27, falling from 30.31 to 30.21.	2.3	8.8	30.14, falling from 30.20 to 30.08.	Fine, sunny, warm, still.	Overcast, yellow fog; still and warm.	Part of halo of 22°.
15	Mar. 12, 1 p. m.	Corona, S...	−3.1	4.4	30.28, variable.....	4.5	6.5	29.93, falling from 30.15 to 29.78.	Fine, sunny, still...	Overcast, rain, strong wind.	Up to 6 d.; width about 1 d.; outer edge red. No halo.
16	Mar. 12, 3 p. m.	Halo, S.....	−3.1	6.5	30.19, variable....	4.5	9.3	29.90, falling from 30.11 to 29.75.	Fine, sunny, still...	Overcast, rain, strong wind.	Halo of 22°, whitish; corona gone.
17	Mar. 19, 10 p. m.	Annulus, M.	†	12.1	29.63, variable.....	†	11.9	29.95, rising from 29.77 to 30.22.	Fine, sunny, fresh gale.	Fine, sunny, strong wind, rain.	With undefined edge; width about 1 d.
18	Mar. 21, 10 p. m.	Corona, M...	1.2	13.3	30.21, variable.....	3.3	13.3	30.13, variable.....	Fine, still.	Fine, light wind, overcast.	Inner edge to 4 d., outer edge 5½ d.; reddish, transient.
19	Mar. 25, 9 a. m.	Halo, S.....	2.3	12.7	30.14, steady	3.5	13.6	30.15, variable.....	Fine, sunny, still ..	Yellow fog, fine, still.	Halo of 22°, inner edge reddish.

* Gradual cooling since the maximum, 9.5°, of the 15th. † Index displaced by vibrations. d. = diameter.

annuli, Nos. 7, 8, and 13, as occurring simultaneously with halos), we have—

Followed by thick fog, 5.
Followed by strong wind without rain or snow, 1.
Followed by rain alone, 1.
Followed by snow alone, 1.
Followed by strong wind, with rain, or snow, or both, 9.
Followed by relatively fine weather, 2.

The four kinds of phenomena, annuli, coronas, halos, and pillars, seem, all of them, to indicate approaching disturbances, seventeen out of nineteen being followed by strong wind or rain, or snow, or fog, or several of these combined. The two failures are both coronas of the moon.

THE RELATION OF THE MOVEMENTS OF THE HIGH CLOUDS TO CYCLONES IN THE WEST INDIES.

By JOHN T. QUIN. Dated St. Croix, Danish West Indies, March 9, 1907.

In June, 1898, the Weather Bureau published at Washington, in pamphlet form, a valuable paper on West Indian hurricanes, which had been prepared by the late Father Viñes, of Havana, for presentation at the Meteorological Congress at Chicago in August, 1893.

In this very instructive paper Father Viñes lays down the theory that, while the lowest air currents in a cyclone tend inward toward the center, the higher currents become more and more divergent as we ascend, until at the level of the cirrus clouds they move in "a completely divergent radial direction". On the last-named point he is very explicit; he says, for example: "If the vortex lies to the south-southeast, the cirrus clouds will move from the south-southeast". Again, on page 18 of the pamphlet, he speaks of a hurricane in September, 1875, the vortex of which, on the afternoon of the 12th, was over the western part of Haiti, 550 miles east-southeast of Havana, and he says that it was from this direction that the cirrus clouds were coming. Hence, there is no possibility of mistaking his meaning; the cirrus clouds, he means, come straight away from the vortex of the cyclone, even tho that vortex be at so great a distance as 550 miles.

But when we give careful attention to this statement we are confronted with the well-known law that the air currents in the Northern Hemisphere, while moving forward, tend to curve to the right on account of the earth's rotation. The volume of air which is supposed to rise from the center of the storm ought, therefore, to flow outward, not in straight lines, but in curved lines, the direction of which, at any given point of observation, would thus come to indicate, not the position of the vortex from which the stream of air had come, but that of a point to the right of the vortex. This point, it is true, might not be far to the right at a comparatively short distance; but as the distance of the vortex from the observer increased, the divergence would increase likewise, till at last the cirrus clouds might come to be moving from a point very far away from the direction in which the storm center lay. Does this law, then, show itself in the movements of the high clouds from a cyclone center, or is it counteracted, or are its effects greatly modified, by the surrounding conditions, so that Father Viñes's statement still remains correct?

We believe that in the case of the trade wind, with which we

in the West Indies are so familiar, the action of the law in question is greatly modified by the surrounding conditions, such as the positions of the continents, the change of seasons, and so on, and it may possibly be the same in the case of our hurricanes. It would seem, therefore, that the best way, perhaps indeed the only way, to settle the question would be by observation. If we could get a bird's-eye view of the ocean area over which the influence of a given cyclone extended, we could soon elucidate the matter; but as we can make our observations only from the earth's surface, extensive cooperation is needed to get at the facts. On the one hand we have to observe the motions of the high clouds, and on the other hand we have to trace the course of the storm center presumed to have some connection with those movements, and when both sets of data have been obtained they can be compared; and it can be seen whether the high clouds come from the center of the storm, or, if not, whether they stand in any other definite relation to such center.

In regard to the direction of movement of the cirrus clouds, it may be remarked that this is easily ascertained when the clouds are numerous and are scattered over the sky. The radiating point can then, with a little patience, be found with certainty, and an entry be made accordingly; but if the cirrus clouds are confined to a part of the sky, far from their radiating point, this latter can be obtained only with a rough approach to accuracy, and the entry concerning the movement has to be made with such qualifying remarks as to considerably reduce its value. The observations noted in the present article were made in the Danish West Indian Island of St. Croix, with as much care as the limited time at the disposal of the writer permitted; and they have been compared with the known tracks of several cyclones, two of the comparisons being also shown in figs. 1 and 2.

The observation of the high cloud movements over any given point is, then, a comparatively easy task, but we have to get the facts about the tracks of the storms before we can make any comparisons, and it is here that the real difficulty arises. After obtaining the first set of data we are often brought to a standstill by the impossibility of getting the second. Occasionally the storm center passes near enough to enable us to estimate, roughly, a part of its course, but sometimes even this is impossible; and most frequently it happens that we have to watch for the chance of seeing newspaper notices, or for the arrival of a ship which has crost the track, before we can get even a few scanty facts for the needful comparison.

It must be seldom, indeed, that the amateur who is waiting for light on his observations is fortunate enough to meet with so lucid a description of the character and course of a cyclone as that which Mr. Page gives of the hurricane of October, 1905, in the MONTHLY WEATHER REVIEW for January, 1906.[1] That great storm had a special interest for us in St. Croix, because the Quebec line steamer *Fontabelle*, from New York for St. Croix, with several passengers for the Danish Islands on board, fell in with it on the 7th, and was in the outskirts of it up to midday on Sunday, the 8th. The gale commenced from the east at 10 a. m. on the 7th, barometer 29.94; at noon the barometer had fallen to 29.85, and later is described as steady at 29.75. At midnight on Saturday the gale was estimated as blowing at the velocity of 65 miles an hour. The steamer was lying to, heading east the whole time, with tremendous seas running. Her position after the storm had past was latitude 29° 30′, longitude 68° 29′. The persistence of the easterly wind was very remarkable, and led many people here to believe, notwithstanding the fall in the barometer, that the storm was not of a cyclonic character. We now know that it was; and the persistence of the east wind may perhaps be explained from the storm's having had an elongated area, as shown in Mr. Page's synoptic charts of its position on the 9th, 10th 11th, and 12th. In those charts the elongation, it is true, lies northeast and southwest, so that to make the explanation complete we should have to suppose that the longer axis had changed its position from that which it had on the 8th, for which date no chart is given. This great storm later became of world-wide interest from the fact that one of its gigantic waves came over the deck of the big liner *Campania* and washt five of her passengers into the sea, from which the storm prevented any attempt to rescue them.

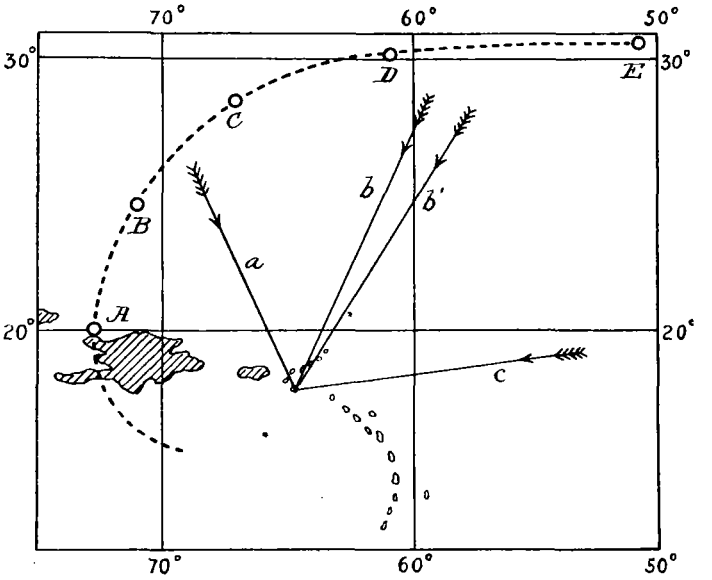

FIG. 1.—Map of cyclone track, October 6–10, 1905, showing direction of movement of high clouds observed at St. Croix.

In fig. 1 the large islands of Haiti and Porto Rico are shown, also the chain of small islands shutting in the Caribbean Sea; the course of the cyclone center is shown by the dotted curved line, the positions *A*, *D*, *E*, being taken from Mr. Page's data, *B* and *C* being inserted as rough approximations by the present writer. The arrow lines centering in St. Croix show the successive directions of the high clouds as they past over the place. It will, therefore, be understood that these arrow lines do not show the *course* of the high clouds, but only the direction which they had when moving over St. Croix. To facilitate comparison the successive positions have been marked with capital letters, and the corresponding high cloud directions with small letters. The position of the center on the 6th is marked *A*, and the cirrus clouds were noted on the morning of this day as coming from north-northwest (see *a*). The position *B* (approximate) on the 7th corresponds to *b*, "cirrus at 7 a. m. from north-northeast", and *b'*, "cirro-stratus at 5 p. m. from northeast by north". The position *C* (approximate) on the 8th corresponds to *c*, "cirro-stratus from east by north; about same direction all day". The distance of the position *A* from St. Croix is nearly 500 miles, of *B* between 500 and 600, of *C* over 700, and of *D* over 800 miles. No cirrus clouds were seen by the writer on the 9th, when the storm center was at *D*, possibly because that center was then too far away; yet this is doubtful, for it will appear probable from the next case to be examined that the movements of these high clouds are at all events sometimes influenced by the cyclone center at a much greater distance than 800 miles.

The case referred to is the cyclone of the early part of September, 1906. The course of the center, as shown in fig. 2, is roughly copied from the chart accompanying Professor Garriott's paper on "The West Indian hurricanes of September, 1906", in the MONTHLY WEATHER REVIEW for that month.[2] The successive positions of the vortex have been marked with their dates, as also have the arrow lines, which give the

[1] Vol. XXXIV, pages 1–7.

[2] Vol. XXXIV, pages 416–423, and Chart IX.

direction of the high clouds on the corresponding days. It will be seen that on the 30th and 31st of August, when the center was probably far out in the Atlantic, the direction of the cirrus clouds was from south-southeast. This was first seen at 5 p. m. on the 30th, and on the following day a note was made that cirrus was "rather abundant from south-southeast". The next morning (September 1) it is noted "9:50, cirrus abundant toward the north, moving from about east-southeast". On September 2, the sky was covered with low clouds, which gave no opportunity of seeing what was going on above; but on the 3d it is noted, "cirrus seen in abundance, but direction difficult to ascertain—about from north-northwest".

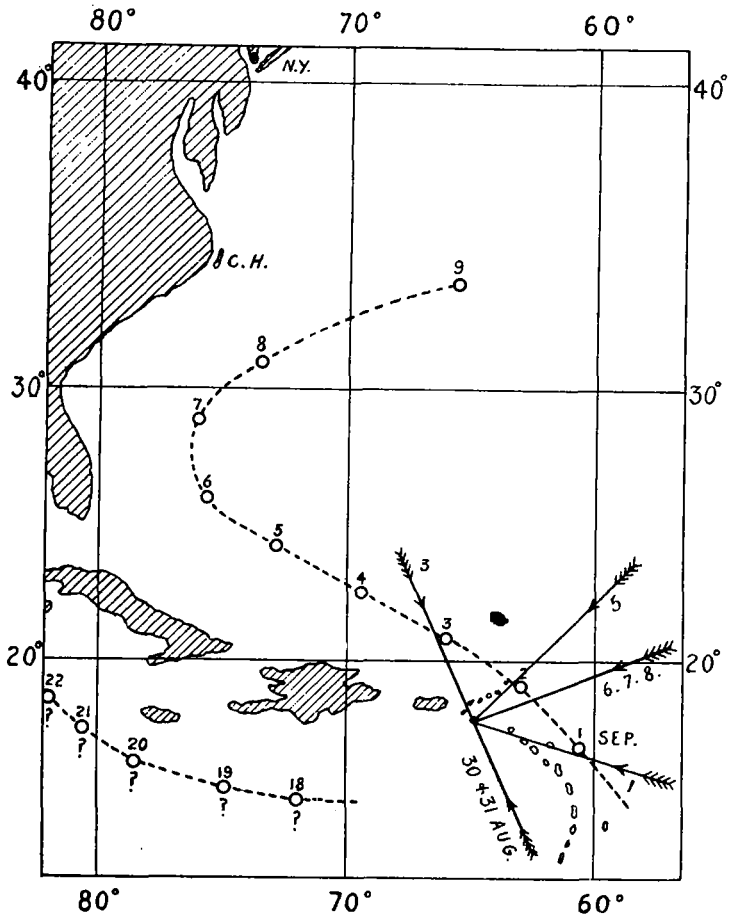

FIG. 2.—Map of cyclone tracks, August and September, 1906, showing direction of movement of high clouds observed at St. Croix.

On the 5th the direction had fallen back to northeast, and on the 6th to east-northeast, from which point the cirrus clouds continued to move on the 7th and 8th, on which last day it is noted that "light cirrus from east-northeast was seen all day". The center was then apparently about 1000 miles from St. Croix, and was moving farther away. The next day (the 9th) it is noted that "no cirrus was seen all day". The track of the storm of September 1–9, 1906, differs from that of October, 1905, in several respects, but notably in this, that the later storm past much nearer to these Danish Islands than the earlier one; and it will be seen that when it came comparatively near to the islands the clouds came from a point near the vortex, whereas when it was far distant, both before and after its passage, there was a considerable angle between the directions of the center and the direction of the arriving cirrus clouds. This was particularly marked after the passage, when the cirrus movements followed the vortex round, so to speak, to the position 3, and then as the vortex moved farther away to the northwest, fell back first to line 5 and then farther back to 6, 7, and 8.

So far as the above two examples are concerned it looks as if there was an undoubted connection between the movements of the storm centers and the cirrus clouds, and that this connection comes under definite law, and we shall perhaps not be wrong in supposing that this law is the one which was mentioned in the first part of this article as confronting us when we came to consider Father Viñes's theory, that the cirrus clouds always come straight from the storm center, irrespective of distance.

It was mentioned above that on the 9th of September, after the passage of the cyclone just considered, no cirrus was visible all day; but after that a very interesting thing happened. On the evening of the 10th, at 6 o'clock, light cirrus was seen moving from some easterly point; but it was so far away to the south that its direction could not be more nearly determined. The next day (11th) it is noted that light cirrus was abundant all day and that the direction, as tested at 6 p. m., was from east by south. On the 12th it was from east-northeast and continued around this point to the 17th—that is to say, this deviation of the cirrus from the normal lasted seven days and this, too, following close on a similar period. A friend to whom I spoke of these observations remarked that such persistence of the high cloud motion from the east was very extraordinary, to which I answered that either there had been a second cyclone passing us on the north, or else we must look for some other cause for some at least of the departures of the cirrus movements from the normal. Time past, however, and no solution came until Mr. J. Lightbourn, editor of the St. Thomas Mail Notes, handed me some clippings which he had been kind enough to save for me; and among them was the following from the Demerara Argosy of September 12, 1906:

> Yesterday, the Liverpool line steamer *Frednes* steamed into port after a voyage of nearly twenty days from Liverpool. The steamer encountered squally weather and strong westerly and southwesterly head winds, north and south of the Azores for about three days. The trade winds were boisterous and squally and heavy rain fell continuously. On September 7, when the steamer was in latitude 16° 50′ N. and longitude 47° 45′ W., a very peculiar phenomenon was observed. The trade winds, which were at that time blowing strongly, suddenly veered round, first to the west and then to the southwest, and increased in force, accompanied by tremendous rain showers. The glass fell nearly half-an-inch and preparations were at once made on board the steamer for a hurricane, but fortunately no hurricane came. From the observations made by Captain Knudson, it was determined that the hurricane was raging to the northwest of the vessel and about 500 miles to the northeast of the West Indian Islands. The hurricane, as far as could be judged from the steamer, lasted for three days, at the end of which time the barometer rose.

Altho the above extract is somewhat obscure, it seems that the *Frednes* was actually on the southern side of a cyclone. It does not appear on which day its center was supposed to be about 500 miles to the northeast of the West Indian Islands; but the cirrus movement over St. Croix from east by south on the evening of the 10th suggests that it was then beginning to influence the high clouds passing over this island, and the subsequent movements of these clouds seemed to show that it took its way across the ocean north of these Danish Islands till the 17th, when for some reason or other its influence ceased. It is curious to note that this is the very day on which a storm coming off the ocean struck Georgetown, S. C., and if Professor Garriott had not in his chart indicated the probable origin of this storm in the Caribbean, I should have been tempted to believe that it was the same as that met by the *Frednes*. No further tidings of the latter storm, however, have reached me, and to say that the movements of the high clouds over St. Croix at that time do not confirm the professor's view, would only be to beg the question which is here under discussion.

We now come to the great Pensacola storm, of which a full account, illustrated by photographs, is given in the article above referred to. This unusually destructive storm came out of the Caribbean thru the Yucatan Channel on the 23d of September, and then crost the Gulf, striking Mobile and Pensa-

cola on the 27th. Its probable course in the Caribbean from the 18th to the 22d is shown in fig. 2, copied from part of Chart IX of the September MONTHLY WEATHER REVIEW. Now it is remarkable, in connection with our present subject, that the high clouds, which, as already stated, had been coming from the east-northeast down to the 17th, came from the northwest on the morning of the 18th. Dense clouds prevented observation of the high clouds on the 19th, but they were again seen to have the direction from the northwest on the 20th and 21st, which, after our study of fig. 1, is just what we might look for in St. Croix with a storm center in the middle of the Caribbean. The further passage of the Pensacola storm was not shown by high cloud movements here; on the 22d the movement was from the southwest, on the 23d from the west-southwest, and for the six following days it continued around these points.

Lastly, we may compare the high cloud movements at St. Croix with the course of the great Central American-Cuban cyclone of October last year. These clouds, which had been coming for several days from the west and southwest, were found early on the morning of the 18th to be moving from the northwest. The same afternoon came the telegrams announcing the great gale near Havana on the 17th. Later news told us of its destructive effects among the Florida islands, then at Miami, whence, as we were told by telegrams, the center had moved off to the *northwest*. If this last statement is correct, the present example has only this value, that it shows that some other causes must have been at work to produce the deviation of the high clouds now to be mentioned. On the 19th they were moving from the north; on the 20th, at 7 a. m., from north-northeast; on the same day at 5 p. m. again from north; and on the 21st from east-northeast. The direction on the 22d was not ascertained, but on the morning of the 23d they moved from east with extreme slowness, later in the day from northeast or east-northeast; on the morning of the 24th slowly from an easterly point, but at noon slowly from north, at 6 p. m. slowly from about west. Thus the abnormal movement ended on the 24th. It would be very interesting to know where the cyclone was during that time. Was the telegram correct, or was *northwest* put for *northeast?* I should think it likely that there was a mistake, the truth being that the vortex crost Florida and continued its course on the Atlantic far to the north of these Danish Islands, and that the high cloud movements followed this vortex around, as in October, 1905.

If it proves to be likely that there was a connection between the cirrus clouds and the cyclone in the above last-named case, then this connection existed at a distance of about 1200 miles, the distance between St. Croix and Havana. That would be a very striking fact if we could establish it.

Without including any doubtful cases, it seems to be made pretty certain, from the first two cases dealt with in this article, that the direction of the high clouds within the influence of a cyclone depends on the distance of the cyclone center from the observer. Father Viñes, himself, noticed that his theory about the varied direction did not always hold good, but he styles the departure from his theory an irregularity, and ascribes it to a cause which, in the opinion of the present writer, is non-existent. He writes, on page 12 of the pamphlet: "As the cyclone moves off to the north of the Tropics and is converted into a cyclone of middle latitudes, the currents gradually lose their regularity, altho their gradation continues the same. Sometimes, however, the movements of cirrus clouds present great irregularities; thus, for example, when the vortex lies to the northwest or north-northwest in the Gulf States, the current of the cirrus clouds is apt to suddenly come from the northeast. In such a case, I believe that the current observed is a resultant of the superior current of the cyclone acting together with the superior general current which at that time of the year comes from the eastern quarter."

Is it true that the upper current moves during the hurricane season from an eastern quarter? I think not, having never seen any good evidence for it. Here, in the eastern Caribbean, the evidence, so far, seems to hint that it may ultimately be possible to show that the upper current moves at all times from a westerly point, unless disturbed by a cyclone or some other special cause. This is probably the case, not only over these islands to the windward, but at Havana also. In a former number of the REVIEW Mr. Page, speaking of the high cloud movements at the latter place, mentions the different directions of cirrus clouds there, and, if I remember correctly, the proportion of normal movements (from westerly points) is large, if not even in excess of the movements from easterly points.

In the above nothing has been said about the rate of movement of the cirrus clouds, but this is evidently an important factor. If, for example, the high clouds whose direction is noted in fig. 1 took twenty-four hours to reach St. Croix, say from position *A*, then the arrow line *b* and not *a* would answer to *A*. It is probable, however, that the distances are traversed in a much shorter time. It is very difficult to form a conception of what a cyclone is really like; but if it turns out to be true that the outflowing upper current can make itself felt a thousand miles away, then it must leave the center with immense force and speed. Occasionally we come across an observation which confirms this view; for example, in Mr. Page's account, referred to in the beginning of this article, we read in the notice from the Chief Officer of the *Texan*, which was bound from Liverpool to Jamaica, and fell in with the great storm on October 9, and came to the "immediate outskirts of the vortex" on the 10th, that "the 9th set in with a moderate southwesterly wind, a northerly swell, and weather exceptionally clear and fine, the sky being cloudless save for *rapidly forming long cirrus feathers passing quickly across from west-northwest*". We can only guess what the starting rate is, and of course it gradually falls off, so as finally to become comparatively slow; but it is probable that we shall not have to allow much time for the progress of the clouds when the distance is only four or five hundred miles.

It would no doubt be rash to say that every divergence of these high clouds from a westerly point of origin is caused by a cyclone; there may be other causes. During the hurricane season last year (August, September, and October, 1906), eight such divergences were noted here. They were August 12–14; August 17; August 26; August 30–September 8; September 10–17; September 30; October 8–10, and October 18–24. The dates are mentioned here so that readers who know something about the cyclonic movements in this part of the world last year may get our side of the matter for a first rough comparison, if they care to make it.

Deviations of the high clouds from the westerly point of origin seem to be very rare outside the hurricane season. I will mention, however, one which was observed here on November 10, 1905. From the early morning of that day till about midday, well characterized cirrus clouds, mostly small, but some of considerable size and feathery, were moving at a moderate rate from southeast by east. Remembering the great distance to which it seems possible for a cyclone to send a stream of high air, we must admit that these clouds *may have come* from a point far out over the Atlantic toward the northeast. Was there such a cyclone there? Was it the same as the great storm which met the *Atrato* on the morning of the 11th and broke over the southern coast of England on the 12th? It would be very interesting, from the point of view of the present article, to know the history of that cyclone.

HAILSTORM AT CORPUS CHRISTI, TEXAS.

By JOSEPH L. CLINE. Dated Corpus Christi, Tex., June 1, 1907.

A hailstorm visited this place Friday, May 31, 1907, during